MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

SRM Number: 3181
MSDS Number: 3181
SRM Name: Sulfate Anion Standard Solution

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Description: This Standard Reference Material (SRM) is intended primarily for use in anion ion chromatography or any other analytical technique that requires aqueous standard solutions for calibration or as control samples. One unit of SRM 3181 consists of five 10-mL sealed borosilicate glass ampoules of a single component solution prepared gravimetrically to contain a nominal 1000 mg/kg of sulfate dissolved in filtered deionized (18 MΩ·cm) water.

Substance: Potassium Sulfate

Other Designations: sulfuric acid potassium salt; sulfuric acid dipotassium salt; dipotassium sulfate; kalium sulphuricum; potassium sulphate.

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component:	**Potassium Sulfate**
CAS Number:	7778-80-5
EC Number (EINECS):	231-915-5
Nominal Concentration:	1000 mg/kg
EC Classification:	Xn (Harmful); not classified in Annex I of Directive 67/548/EEC
EC Risk:	R22 (harmful if swallowed) R36/37/38 (irritating to eyes, respiratory system and skin)
EC Safety:	S22 (do not breathe dust) S24/25 (avoid contact with skin and eyes)

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0-4): Health = 1 Fire = 0 Reactivity = 0

Major Health Hazards: This material can irritate the skin, eyes, and respiratory system. It is also harmful if swallowed.

Physical Hazards: Glass container may break or shatter.

Potential Health Effects

Inhalation: Potassium sulfate dust can irritate the respiratory system, but no long-term effects have been reported.

Skin Contact: This material can cause temporary skin irritation.

Eye Contact: Potassium sulfate dust can cause mechanical eye irritation and possible abrasion.

Ingestion: Ingestion of this material can cause nausea, vomiting, diarrhea, and stomach pain. In rare cases, potassium poisoning may result from a large dose or prolonged exposure. Effects may include changes in blood pressure, irregular heartbeat, drowsiness, dizziness, disorientation, internal bleeding, and paralysis.

Medical Conditions Aggravated by Exposure: Hyperkalemia; kidney disease (makes it harder to eliminate excess potassium); pre-existing conditions affecting any of the target organs, such as asthma, COPD, conjunctivitis, or dermatitis.

Listed as a Carcinogen/ Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

4. First Aid Measures

Inhalation: Move the person to fresh air immediately. Get medical aid if irritation persists or if breathing difficulty develops.

Skin Contact: Remove contaminated clothing. Wash affected skin with soap and water. If irritation persists, get medical aid and bring the container or label. Wash contaminated clothing before reusing.

Eye Contact: Remove contact lenses (if any). Flush eyes with running water for at least 15 minutes, keeping eyelids open and raising lids to remove all chemical. If irritation persists, get medical aid, and bring the container or label.

Ingestion: If a large dose was ingested and symptoms appear (see "Section 3"), contact a poison control center for instructions. Do not induce vomiting except on the advice of qualified medical personnel. Get medical aid if necessary, and bring the container or label.

5. Fire Fighting Measures

Fire and Explosion Hazards: Potassium sulfate alone is not flammable or explosive, but in solid form it may explode when heated with aluminum or magnesium.

Extinguishing Media: Use extinguishing media appropriate to the surrounding fire: water spray, dry chemical, carbon dioxide, or foam.

Fire Fighting: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point (°C): N/A

Autoignition (°C): N/A

Lower Explosive Limit (LEL): N/A

Upper Explosive Limit (UEL): N/A

Flammability Class (OSHA): N/A

Products of Combustion: Thermal decomposition of potassium sulfate can produce toxic fumes, including oxides of sulfur and potassium.

6. Accidental Release Measures

Occupational Release: Isolate the spill area and absorb spilled liquid with sand or other non-combustible material. Cleanup personnel must wear personal protective equipment ("Section 8"). Sweep up solid material and place in a suitable container for reclamation or disposal, using a method that does not generate dust.

Disposal: Refer to "Section 13, Disposal Considerations".

7. HANDLING AND STORAGE

Storage: Store in tightly closed container in a cool, dry, well-ventilated place and protect from mechanical damage. Keep away from incompatible materials.

Safe Handling Precautions: Wear suitable gloves, or wash hands after contact.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: No TLV has been established for this material. Limits for total dust, nuisance dust, or particulates not otherwise classified:

ACGIH TLV-TWA: 10 mg/m^3 (inhalable particles); 3 mg/m^3 (respirable particles)
OSHA TWA-PEL: 15 mg/m^3 (total dust); 5 mg/m^3 (respirable dust)

Ventilation: Use local or general exhaust to keep employee exposures below limits. Local exhaust ventilation is preferred because it can control contaminant emissions at the source, preventing dispersion into the general work area. Refer to the ACGIH document *Industrial Ventilation, a Manual of Recommended Practices*.

Respirator: If necessary, refer to the *NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84* for selection and use of respirators certified by NIOSH.

Eye Protection: Use chemical safety goggles where dusting or splashing of solutions may occur. See OSHA standard (29 CFR 1910.133) or European Standard EN166. The employer should provide an emergency eye wash fountain and safety shower in the immediate work area.

Personal Protection: Wear appropriate gloves and protective clothing to minimize contact with skin.

9. PHYSICAL AND CHEMICAL PROPERTIES

Component: Potassium Sulfate

Appearance and Odor: White granules or powder, no odor

Relative Molecular Weight: 174.26

Molecular Formula: K_2SO_4

Density (g/cm^3): 2.66

Solvent Solubility: Soluble in ethanol and methanol.

Water Solubility: Soluble (110 g/L @ 20 ºC).

Boiling Point (°C): 1689 (3072 ºF)

Melting Point (°C): 1067 (1953 ºF)

Vapor Density (Air = 1): N/A

pH: Approximately 7

NOTE: Physical and chemical data are for the pure component of potassium sulfate.

10. STABILITY AND REACTIVITY

Stability: __X__ Stable _____Unstable

Stable at normal temperature and pressure.

Conditions to Avoid: Contact with incompatible materials.

Incompatible Materials: Strong oxidizing agents, aluminum, magnesium, sodium, calcium.

Fire/Explosion Information: This material alone or in aqueous solution is not a fire or explosion hazard. In solid form, potassium sulfate reacts violently when heated with aluminum or magnesium.

Hazardous Decomposition: Thermal decomposition of potassium sulfate can produce toxic fumes, including oxides of sulfur and potassium.

Hazardous Polymerization: ____ Will Occur __X__ Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: __X__ Inhalation __X__ Skin __X__ Ingestion

Toxicity Data:

Rat, oral, LD_{50}: 6600 mg/kg
Woman, oral, LD_{Lo}: 750 mg/kg

Target Organ(s): Respiratory tract, skin, eyes, GI tract.

Mutagen/Teratogen: This material is not considered to be a human reproductive hazard. Its toxicological properties have not been fully investigated.

Health Effects: See "Section 3".

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:

Water flea (*Daphnia magna*), LC_{50} (96 hrs): 653 mg/L
Bluegill (*Lepomis macrochirus*), LC_{50} (48 hrs): 720 mg/L
Fathead minnow (*Pimephales promelas*), LC_{50} (96 hrs): 680 mg/L

Environmental Fate: If released to the environment, this material can persist in natural water.

Environmental Summary: Potassium sulfate is not acutely toxic to most aquatic organisms, but its toxicity has not been fully evaluated.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of container and unused contents in accordance with federal, state, and local requirements, which vary according to location. Although this material is not a listed RCRA hazardous waste, it may exhibit one or more characteristics of a hazardous waste and thus requires appropriate analysis to determine specific disposal requirements.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated.

15. REGULATORY INFORMATION

U.S. REGULATIONS

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302: Not regulated.

SARA Title III Section 304: Not regulated.

SARA Title III Section 313: Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE:	Yes
CHRONIC:	No
FIRE:	No
REACTIVE:	No
SUDDEN RELEASE:	No

STATE REGULATIONS

California Proposition 65: Not regulated.

CANADIAN REGULATIONS

WHMIS Classification: Not regulated; D2B, materials causing other toxic effects.

WHMIS Ingredient Disclosure List: Not listed.

CEPA Domestic Substances List (DSL): Listed.

EUROPEAN REGULATIONS

EU/EC Classification: Xn (Harmful); not classified in Annex I of Directive 67/548/EEC

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): Listed

TSCA 12(b), Export Notification: Not listed

16. OTHER INFORMATION

Sources:

International Programme on Chemical Safety (IPCS), International Chemical Safety Card: *Potassium Sulfate*.

IUCLID Chemical Data Sheet: *Potassium Sulphate*. European Chemicals Bureau, 19 Feb 2000.

PAN Pesticides Database: *Potassium Sulfate*.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.